Using Models in EST

By Peter Master

The use of models in the teaching of writing to non-native speakers of English has been somewhat controversial. The argument hinges on the perception of what constitutes a good model and how it should be exploited in the classroom. That argument, as articulated in the 1980s, was largely limited to the teaching of composition in ESOL settings. It did not include the use of models in English for Science and Technology (EST). In this article, I define "model" and review what the literature says about the use of models in the teaching of writing. I then provide a justification for the use of models in the teaching of English for Science and Technology and provide a practical demonstration.

Definitions

A model is a sample of writing that is used for pedagogical purposes. There are three basic categories: *controlled*, *semi-controlled*, and *decontrolled*.

Controlled models are generally designed for students with low proficiency levels, as they require the least amount of independent thinking. One type provides a simple paragraph and prompts the student to copy the paragraph verbatim or to make certain changes throughout the paragraph, such as changing the time from present to past, changing the subject from male to female, or reversing the sequence of events. Another type provides a model paragraph or essay with blanks for grammatical elements (e.g., verbs, prepositions, articles, sentence connectors) with choices provided or as a modified cloze exercise. Another type generates a paragraph from a series of questions asked either orally by the teacher or presented as a writing task (see for example Alexander 1965). An additional type provides a paragraph with a missing topic or thesis sentence and asks students to select a suitable sentence from a list of options or generate an appropriate sentence on their own. A variation on this type is the presentation of a paragraph with the task of removing irrelevant sentences (for unity) or adding supporting examples.

Semi-controlled models are appropriate for intermediate-proficiency students as they require considerable knowledge of grammar and sentence structure and some writing experience. One type requires the student to write a paragraph with explicit instructions. Taylor (1976:317), for example, provided the following task:

1. prompt: Write a paragraph that tells what you usually do on Saturday.
2. use present tense
3. use frequency adverbs (*always*, *usually*, etc.)
4. use chronological order
5. [possible topic sentences provided]

Another type provides a diagrammatic model of paragraph structure which the student is asked to complete. Raimes (1983:126) provided the following task:

a) Topic sentence
One of the healthiest vacations is a bicycle trip.

SUPPORT 1
SUPPORT 2

b) Introduction
Thesis Statement (Main Idea)
Topic sentence: SUPPORT 1
Topic sentence: SUPPORT 2

c) Conclusion

Another type provides a chart, table, or graph that must then be transformed into a unified piece of writing. The chart might include a historical timeline, an experimental procedure, etc.

Decontrolled writing is appropriate for intermediate to advanced proficiency students with substantial experience of writing and a solid background of language knowledge. One type asks students to compare different models and then to generate a similar piece of their choice, keeping the same purpose but changing the topic, participants, and/or setting. An example is suggested in Watson (1982:11) with an informal letter of apology ("I'm very sorry that...") and a contrasting formal impersonal one ("We greatly regret that..."). Another type, perhaps the most common, provides a model essay (or sometimes a reading passage), which students must read, analyze, and discuss before setting out to write an original essay on a given topic or choice of topics.

Another classification of models is constructed vs. authentic types. Constructed models are usually utilized at lower proficiency levels because authentic text is simply too difficult for the students to derive any pedagogical benefit from. However, constructed models present a variety of problems, which will be discussed shortly, and it is generally believed that a simpler authentic model is preferable to a constructed one.

The Use of Models in ESOL Classes

The issue of using models in the teaching of ESOL writing was somewhat controversial in the 1980s but has not been discussed very much since. Some saw advantages in using models, while others found only problems.

Advantages of using models
The advantages of using models relate to the creativity they can potentially stimulate. Watson (1982:8) found several reasons to make use of models in the writing classroom. The typical pattern is to present the model first, then discuss and analyze the model to increase student awareness, and finally have students generate their own parallel essay on a suggested topic. Models provide exposure to conventions of the language, especially discourse but also lexical items and structural patterns; they demonstrate many modes of rhetorical organization,

communicative purpose, and anticipated audience; and they are windows on culture, revealing customs, values, assumptions, and attitudes toward the world. Rhetorical models may also focus attention on the way successful writers handle larger units of discourse. If writing is stimulated by a model (e.g., from literature) such that the writing becomes a personal reaction and thus involves students' own feelings, then "alien product really has informed original process and the result is likely to be genuine composition" (Watson 1982:8).

Watson (1982:13) suggested that models are useful if students are encouraged to treat the model as a resource rather than the ideal, exploring it with the teacher and with each other and comparing it to their own products at various stages in their writing. He recommended presenting the model as one way, certainly not the only way, to realize a particular communicative purpose, which is "most useful when [it is] integrated into the sequence of activities within the writing lesson." Watson (1982:13) further suggested that, exploration and analysis of models should involve students actively working together, in the expectation that shared discoveries and reactions will result in genuine composition. When models are used within the writing process, students can easily perceive their purpose and utility..The student writers thus control the total process, including recourse to the model, because their own writing has quite clearly become the central concern of the lesson.

Escholz (1980) provided an alternative use. If models are provided *after* the student has made an initial attempt to write, they may demonstrate solutions that students can use for themselves in their subsequent drafts.

Raimes (1983) suggested that the problems associated with the use of models may be avoided if the model is used not so much as a straitjacket but as a resource for possible ways of organizing information. "The model becomes not what he should do but only an example of what he could do" (1983:127). She suggested that comparing a model to what a writer has already generated allows the student to say how the two are similar and how they are different. Comparing two models, on the other hand, shows students the potentials of different forms of organization.

Problems with using models

The problems with using models arise primarily from the potentially inhibiting effect they have on the writer. Taylor (1976:317) believed that the use of models may underlie the common misconception that a writer has failed if s/he does not produce a polished essay on the first attempt and that revision is "punishment" for having failed. He argued that there is no guarantee that the necessary skills exemplified in a model will be transferred or that the student will be able to draw on the information when s/he actually needs it. It is better to show students "where their own arguments are weak or where their logic breaks down" (Watson 1982:12) than to have them study models of someone else's writing.

While Watson found some positive aspects about the use of models, he also believed that models are product-oriented and therefore lead to artificial products (texts). Escholz said that models are usually too long, too remote from students' own writing problems, and too likely to promote reading comprehension and rhetorical analysis rather than writing. He saw the imitation of models as "stultifying or inhibiting writers rather than empowering or liberating them" (Escholz 1980:24). Raimes did not like models because they encourage students to think that form comes

first, as a "predetermined mold (like a cake pan or a dessert mold) into which they pour their content" (1983:126-7). This procedure does not allow the writer "to discover the shape that best fits the ideas he wants to express for a particular purpose" (1983:127). Kessler, Harrison, and Hayes (1979) concurred, believing that form arises out of attempts to communicate, not by syllabus design.

Finally, Meade and Ellis (1970) and Braddock (1974) argued that some methods of paragraph development that are presented and taught do not exist in published expository writing. Watson (1982:7-8) criticized such constructed models as being "depressingly artificial" and worse, that they offer "false reassurance."

Justification for Using Models in EST

ESP shifted the overemphasis on process back to a legitimate concern for product, primarily because it reminded us that the world wants products and does not particularly care how they were created. The concept of genre analysis has shown us that there are prescribed forms for use in technical writing, and that in order to be accepted into the occupational subculture or discourse community, those forms must be adhered to. This is the primary justification for the use of models in EST. However, we may take note of some of the problems ascribed to the use of models above so that we may use them in the most efficient way possible. It should be noted, however, that "creative writing" and "technical writing" are fundamentally different since the primary purpose of the former is to discover one's voice and intent, whereas the primary purpose of the latter is to communicate in a manner that is clear, concise, and acceptable to the members of the occupational subculture. This final purpose has been recently criticized as being "accommodationist" (see Allison, 1996, for a discussion of this issue), but it is beyond the scope of this article to discuss critical pedagogy.

Practical Demonstration

One technique for using models was described in Master (1986, soon to be republished as *English Grammar* for *Technical Writing*). Two examples are provided here, one concerning an amplified definition and the other a description of a mechanism. The demonstration is designed to be carried out in pairs so that teachers can experience the task for themselves before they try it out with their students.

Amplified definition

Before introducing a model of an amplified definition, several elements must be introduced. These include a list of amplification techniques and the typical structure of an amplified definition. It is presumed that the student is already familiar with the basic structure of a formal definition (i.e., An A is a B that C).

In order to understand and apply the notion of amplification, the student is asked to choose one of the following definitions to amplify:

a. A vaccine is a sterile liquid medium that contains an avirulent strain of a specific pathogen (Longman 1979:369).
b. An n-type semiconductor is a type of semiconductor in which most of the current is carried by electrons rather than holes (Longman 1979:534).
c. Thixotropy is the property of a liquid by which it has a lower viscosity at a higher rate of flow (Longman 1979:281).

Most students will not understand the formal definition as given without further information, which is the primary rationale for an amplified definition. The student is provided with ten techniques for amplifying a definition, which may be discussed first or not depending on the proficiency level of the students:

1. Further definition of terms in the opening definition
2. Concrete examples or instances
3. Parts or components
4. Basic operating principle
5. Purpose or method of use
6. Cause and effect (what it does)
7. Word derivation (of the term)
8. Location and time (when and where it is used)
9. Negative statement (what it is not)
10. Comparison and/or contrast

Before moving into the model, the structure of an idealized amplified definition is presented and discussed. The structure is as follows:

A. A formal definition
B. Three or more amplification techniques
C. A description of special uses, more complex types, etc.

The model is now ready for analysis through the completion of the following task:
A. With a partner, analyze the model of an amplified definition (See Figure 1).

1. In the margins, label the formal def-inition, the series of amplification techniques, and/or a description of special uses or more complex types, if present.
2. Then label each specific amplification technique from the list of 10 above.

B. Discuss the results of your analysis.

1. Was there a formal definition at the beginning of the model?
2. Which specific amplification tech-niques were used?
3. Did the model end with a description of special uses or more complex types?

4. To what extent did the model follow the idealized structure?

For practice, the student is now asked to do the following:

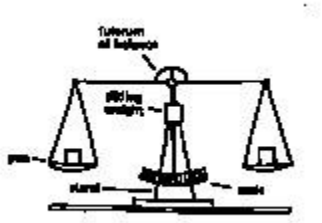
A. Write an amplified definition for one of the following formal definitions:

1. An antibody is a protein produced in the blood of a living animal following the introduction of an antigen (Longman 1979:367).
2. A relay is a device by which electric current flowing in one circuit can open or close current in a second circuit (Longman 1979:516).
3. A nursery is a place where seedlings or young plants are grown from seeds with special care before transplanting them to fields (Longman 1979:335).

B. Finally, the student is asked to write an amplified definition for a term in his or her field of study. A list of potential topics may be provided for students at a lower-level of proficiency or experience.

Description of a Mechanism

Before introducing a model of a description of a mechanism, the student is asked to write a short description of one of the following diagrams.



Before moving into the model, the structure of an idealized description of a mechanism is presented and discussed. The structure is as follows:

A. Introduction

1. Formal definition
2. Purpose
3. External description
4. Plan-of-development sentence

B. Description of Part A
1. Definition
2. Purpose
3. Details (e.g., shape, size, location, method of attachment, material, finish)

C. Description of Part B (with same details)

D. Description of Part C (with same details)

E. Conclusion

1. Possible concluding techniques:
   a. mechanism in action
   b. advantages
   c. disadvantages or limitations
   d. special uses or applications
   e. latest developments or models

The model is now ready for analysis through the completion of the following task:

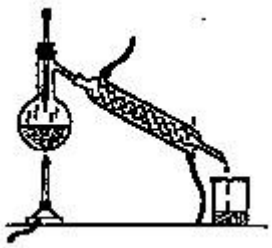
A. With a partner, analyze the model of a description of a mechanism (See Figure 2 below).

1. In the margin, label the introduction, the description of Part A, the description of Part B, the description of Part C, and the conclusion, if present.
2. Now label each sentence within each paragraph according to the idealized specifications above (formal definition, plan-of-development sentence, etc.). Then discuss the results of your analysis:

1. Was there a formal definition at the beginning of the model?
2. Was there a plan-of-development sentence?
3. How many parts was the mechanism divided into?
4. Was there a conclusion? If so, how was it constructed?
5. To what extent did the model follow the idealized structure?

For practice, the student is now asked to do the following:

A. Write a description of a mechanism for the following diagram:



B. Finally, the student is asked to write a description of a mechanism in his or her field of study. A list of potential topics may be provided for students at a lower level of proficiency or experience.

Conclusion

The use of models in ESP is justified by the formal schemata of most forms of technical writing, i.e., there is usually a prescribed format. The analysis of models is designed to support the socialization process required for entrance into the occupational subculture that the student hopes to become a member of. Once the student is familiar with the basic written expectations of the field or subculture, he or she is free to modify the format as appropriate for the topic and the audience. It is a good idea to include as models samples of successful technical writing that do not adhere in all aspects to the idealized structure so that the student can see that a strict use of this format is not required.

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Figure 1

An Aneroid Barometer

An aneroid barometer is an instrument that depends on the changing volume of a container to indicate atmospheric pressure. It consists of an airtight box of thin flexible metal from which the air has been partially evacuated. One side of the evacuated box is attached to a spring. When the atmospheric pressure increases, the box tends to collapse. When atmospheric pressure decreases, the sides of the box spring outward. This slight movement is magnified by a series of levers connected to an indicator needle, which shows the atmospheric pressure.

A variation of the aneroid barometer called the Bourdon gauge was invented by Eugene Bourdon, a French engineer. A flattened tube of metal is evacuated and bent into a circle. The circle tends to close up with greater pressure and open out with lesser pressure. This movement is transmitted to a dial as in the aneroid barometer. The Bourdon gauge is most suitable for measuring high pressure (e.g., 2000 atmospheres).

Master (1986:28-29)

Figure 2

The Sierra Portable Air Conditioner

The Sierra portable air cooler, model Y, is a device for cooling and ventilating a room that does not exceed 2400 cubic feet in volume. It functions partly as an electric fan, but also draws air through a filter down which water is trickling, and cools the air by evaporating the water.

This air cooler is small and light enough to be portable. Its base is 17 inches square, though a grill in the front increases the total depth to 19 inches. Its height is 16 inches. At a point 13 inches from the bottom, each side turns toward the center, rising at a 45 degree angle, so that the total volume is reduced and the flat top is 9 inches wide and 17 inches deep instead of being equal in size to the bottom. Pressed aluminum has been used so far as possible in the construction, and thus the weight of the cooler has been held to 15 pounds. The cooler consists, in the main, of the pressed aluminum outer shell, the lower portion of which functions as a reservoir for the water; the motor and fan, which cause the circulation of air; and the water-evaporating system, which cools the air that is circulated.

The outer shell, as mentioned above, is 17 inches wide, 17 inches deep, and 16 inches high. It consists of the base and the shell itself. The base is made of heavier aluminum and serves as the reservoir. It consists of the square bottom and of sides that are 3 inches high. The upper section of the shell sets down into the base, and the two portions are riveted together. In this portion of the shell, the sides and top are an unbroken sheet of pressed aluminum. The back, however, is not covered by the shell, and the front contains an opening 12 inches in diameter into which is bolted a round meshed wire screen that protrudes 2 inches. This screen lets the air blown by the fan pass through but prevents the fan from being touched. An aluminum strip across the open back strengthens the structure, and a handle bolted to the top makes the cooler easy to carry.

The circulation of air is caused by the fan and motor. The fan, which is set close to the front opening, has three wide blades and is 12 inches in diameter. The motor is rated at 1/30 horsepower and operates on the ordinary 110-volt alternating-current lighting circuit. Its consumption of electricity is approximately that of a 75-watt light globe. Driven by this motor, the fan delivers 1140 cubic feet of air per minute. Both the motor and fan are supported by a sturdy cast-aluminum frame that is riveted to the base.

The water-evaporating system is the portion that cools the air. It consists mainly of a pump and of the evaporation screen. The pump is of the impeller type and is driven by the same

motor that drives the fan. It is set near the back of the reservoir. Water is carried from the reservoir to the evaporation screen by a 1/4-inch rubber tube with aluminum connections at each end. The evaporation screen consists of a distributor-a V-shaped aluminum trough running from side to side near the top-and the screen itself, which consists of excelsior supported by the light wire bottom of the cooler, so that the surface down which the water trickles is larger than it would be otherwise. This evaporation screen almost entirely covers the back of the cooler, though it is set far enough forward to permit water to be poured into the reservoir at the back.

In action, the cooler functions as follows: The fan draws air into the back of the cooler, through the excelsior grid screen and blows it out at the front. The pump delivers water to the top of the grid screen, where it trickles down to the reservoir for recirculation. Part of the water, however, evaporates in the air passing through, and thus cools the air. The cooled air is blown out the front of the cooler at the rate of 1140 cubic feet per minute and reduces the temperature in the room. Thus, the air cooler can be used with good results on any occasion when the relative humidity is low enough to cause the water to evaporate.